REGISTRATION ELIGIBILITY & CONTACT MANAGEMENT

PROJECT PLANNING PROCESS DEFINITION

Version 1.0

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VA Enterprise Architecture Management
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RECORD OF CHANGES

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VERSION NUMBER	DATE	NUMBER OF FIGURE, TABLE OR PARAGRAPH	__A*__ __M__ __D__	TITLE OR BRIEF DESCRIPTION	CHANGE REQUEST NUMBER

TABLE OF CONTENTS

Section **Page**

LIST OF FIGURES

Figure **Page**

SECTION 1. INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the processes, procedures, and guidelines that should be followed by a software project manager to plan and execute a productive and successful project. .

1.2 BACKGROUND

The planning phase is one of the most crucial steps in any software development project. The success of a software project is often determined in the planning phase. Lack of adequate planning often results in a project's failure to meet cost, schedule, or performance objectives or all three. The quality of a project plan often reflects the quality of a project. Be thorough, concise and precise. It is never too early to plan. SPP is a Level 2 Key Process Area (KPA) in the Capability Maturity Model for Software (SW-CMM). Satisfying this KPA is a major step toward achieving Level 2 (Repeatable). This KPA requires a written process for planning a software project. It also requires the development of a project Software Development Plan (SDP), which is the document that describes the plan for the software project. This process also covers many of the activities detailed in the Level 3 Integrated Software Management (ISM) KPA, which covers project planning activities from an organizational perspective.

1.3 SCOPE

This process applies to any software project and also to any activity of the software development life cycle. Though this process is written from the viewpoint of a project in the Requirements phase, it can be easily modified for use by projects in any phase of the software life cycle. Even software projects that are in life cycle maintenance can implement this process for planning software builds or for implementing Engineering Change Proposals (ECPs).

1.4 DOCUMENT OVERVIEW

This document addresses steps and guidelines for performing software development planning on a software project. Section 1 provides background and process overview information. Section 2 provides detailed information on each step of the process. Section 3 provides information on software project planning aides. The following list provides the format and the format definitions used to describe each of the process steps in Section 2 of the SPP Process:

a. PURPOSE: The objective of the process activity. If a sub-process activity exists, the details are described in that specific paragraph description.

b. ROLES AND RESPONSIBILITIES: The responsibilities of individuals or groups for accomplishing a process activity.

c. ENTRY CRITERIA: The elements and conditions necessary to be in place to begin a process activity. Reading lower level activities assumes that the entry criteria for all higher level activities have been satisfied.

d. INPUT: Data or material with which a process activity is performed.

e. PROCESS ACTIVITY: Actions to transform an input, as influenced by controls, into a predetermined output.

f. OUTPUT: Data or material produced by or resulting from a process activity. It must include the input data in some form. The output title differs from the input title to indicate that an activity has been performed.

g. EXIT CRITERIA: Elements and/or conditions necessary to be in place to complete a process activity.

h. PROCESS METRICS: Data collected which can be analyzed and used to improve the process.

1.5 PROCESS OVERVIEW

1.5.1 Initiate Planning

The SPP Process begins with the planning initiation step. In this step, key project leadership positions are assigned, including the software project manager, and resources and budget are allocated to the planning and re-planning activities. Requirements are the major driving force in SPP and therefore are a major interface to this process. Procedures for determining the initial software estimates should be used once the requirements have been identified. The software activities are also developed in this step.

1.5.2 Develop SDP

The SDP should include items such as software estimates, schedules, milestones, Work Breakdown Structure (WBS), software development environment, software development methodology, software test methodology, and software risks. Software risks should be derived by following the organization's Risk Management process. The SDP is used to establish commitments on the project. In developing the SDP, the project manager should also ensure that project personnel receive proper training to perform their jobs. .

1.5.3 Review and Approve SDP

After the SDP has been developed, it should undergo formal review and approval. Review of the SDP should include all groups internal and external to the organization who will be affected by the work in the SDP. Affected groups, both internal and external to the organization, should also approve the SDP by either participating in the peer review of the SDP or by signing the signature page of the SDP indicating their commitment and acceptance of the SDP. After the SDP has been approved it should be placed under configuration management.

1.5.4 Implement SDP Processes and Apply SPTO Process

The project is now ready to implement the activities as described in the SDP. In implementing the SDP, follow the project's tailored version of the SPTO process to provide information about the software project that can precipitate changes to the SDP. These changes should be implemented in accordance with the project's SCM Process. Project risks should be monitored in accordance with the Risk Management process. The project should also implement the project's Software Quality Assurance (SQA) Process, tailored from the organization's SQA Process, to monitor the project's software development activities. In addition, the SQA group should be monitoring the activities of the SPP process.

1.5.5 Measure and Improve the Process

Metrics should be collected on each process step and then used to develop process improvements to the SPP Process. These measurements are analyzed against both planned and historical data, if available. Other project processes should also be measured, analyzed, and improved at this time.

1.5.6 Record Lessons Learned

Lessons learned from the implementation of the project should be recorded and shared for use by other projects.

1.5.7 Revise the SDP

Proposed changes to the SDP are analyzed and approved changes are implemented. After changes are made, the SDP should follow the project's standard review and approval process for project documentation (e.g. the project's SCM Process) Revising the SDP is an ongoing activity performed throughout the the life of the project.

1.6 REFERENCE DOCUMENTS

The following documents are either referenced in this document or were used to create it:

a. Software Project Planning Policy

b. Software Engineering Process Policy

c. Requirements Management Guidebook
d. Estimation Process
e. Software Configuration Management Process
f. Peer Review Process
g. Software Project Tracking and Oversight Process
h. Software Quality Assurance Process
i. Software Development Plan Template
j. Training Program Process
k. Organization Project Management Plan
l. Description of the RE&CM Software Process Assets
m. Organization measurement Guide
n. Risk Management Process
o. Integrated Software Management/Software Product Engineering/Inter-group Coordination (ISM/SPE/IC) Implementation Guide
p. Software Management for Executives Guidebook
q. Contractor Acquisition and Performance Monitoring (CAPM) Process
r. MIL-STD-498 Software Development and Documentation, 5 December 1994
s. Capability Maturity Model for Software V1.1

1.7 ABBREVIATIONS, ACRONYMS AND TERMS

CAPM	Contractor Acquisition and Performance Monitoring
CMM	Capability Maturity Model
DCR	Document Change Request
DID	Data Item Description
ECP	Engineering Change Proposal
IC	Inter-group Coordination
ISM	Integrated Software Management
HTML	Hypertext Markup Language
KPA	Key Process Area
MS	Microsoft
MIL-STD	Military Standard
NAWCAD	Naval Air Warfare Center
PR/CR	Problem Report/Change Request
RM	Requirements Management
OPMP	Organization Project Management Plan
OSPD	Organization Software Process Database
SCM	Software Configuration Management
SCMP	Software Configuration Management Plan
SDP	Software Development Plan
SOW	Statement of Work
SPE	Software Product Engineering

SPM	Software Project Manager
SPP	Software Project Planning
SPTO	Software Project Tracking and Oversight
SQA	Software Quality Assurance
SQAP	Software Quality Assurance Plan
SSM	Software Subcontractor Management
SW-CMM	Capability Maturity Model for Software
TBD	To Be Determined
WBS	Work Breakdown Structure

Project Manager - person responsible for planning and execution of the project, both hardware and software.

Software Project Manager (SPM) - person responsible for the planning and execution of the software portion of a project.

Sponsor/Customer - the acquirer of the system being developed. The source of the funding for the project.

SECTION 2. SOFTWARE PROJECT PLANNING PROCESS DEFINITION

This section describes each of the process steps as depicted in Figures 2-1 and 2-2.

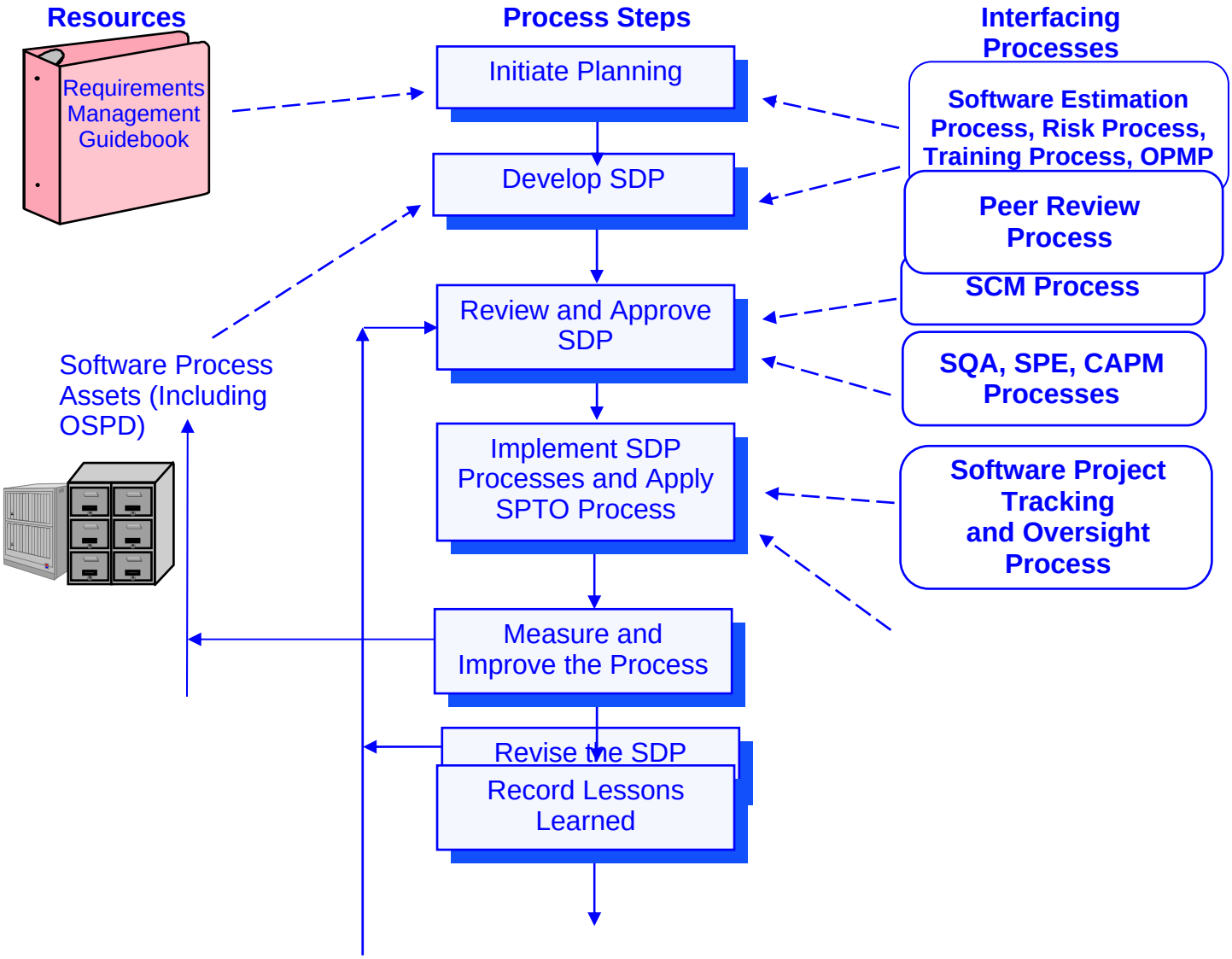

Figure 2-1. SPP Process Flow Diagram

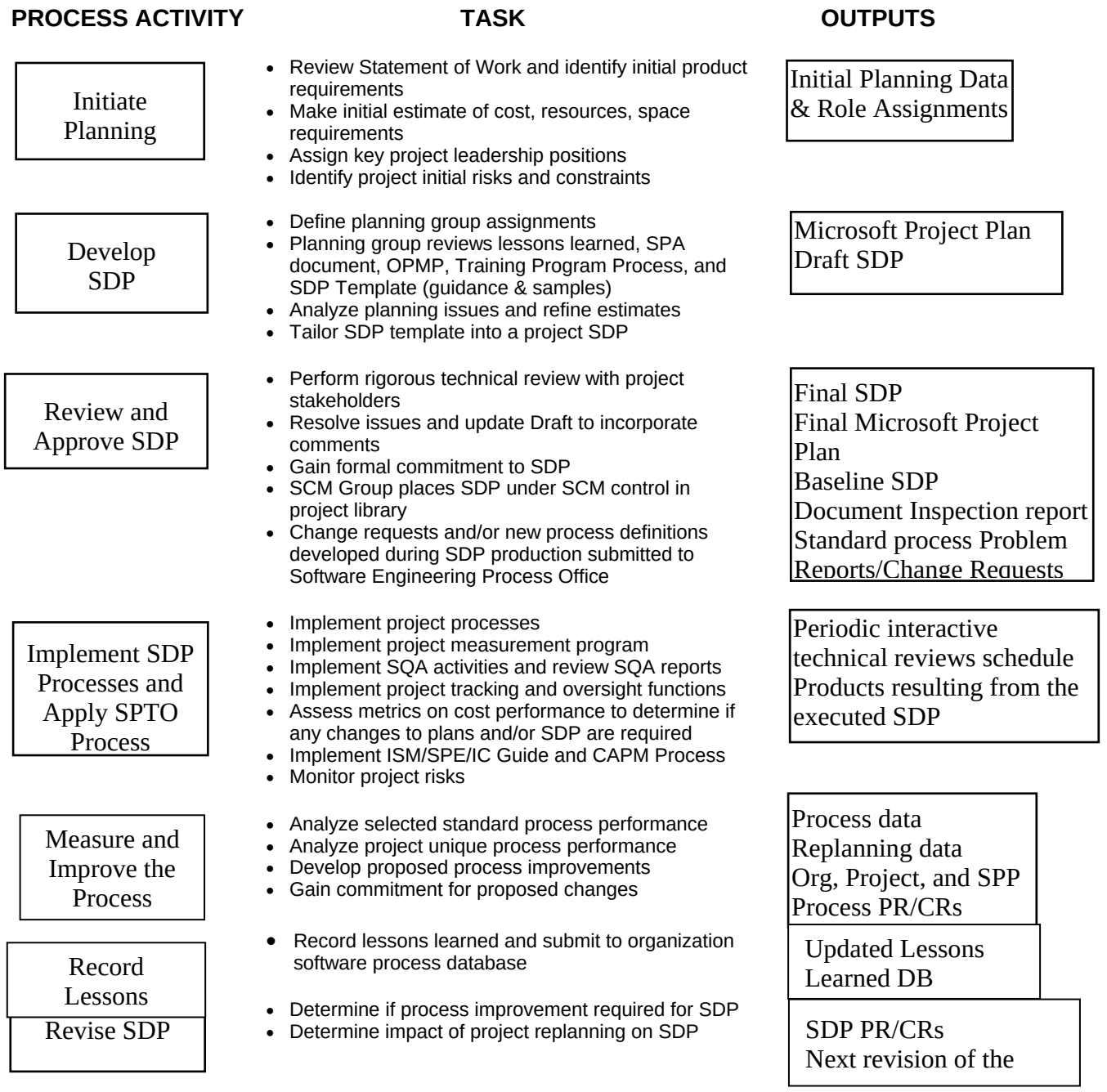

Figure 2-2. Project Planning Process

2.1 INITIATE PLANNING

2.1.1 Purpose

The purpose of this process step is to ensure that the necessary requirements have been met to properly carry out the planning activities.

2.1.2 Role and Responsibility

The project manager is responsible for carrying out this process step.

2.1.3 Entry Criteria

The entry criteria for this step are listed below:

a. A Software Project Manager (SPM) is designated to be responsible for developing software size, cost, schedule, and resource estimates; preparing project planning documents; and negotiating commitments.

b. Those responsible for preparing the project planning documents are skilled or have received training in software project planning and software estimating.

c. The Statement of Work (SOW) or tasking statement has been documented and approved. The SOW or task statement should include the following items

   1. Scope of the work
   2. Technical goals and objectives
   3. Identification of customers and end users
   4. Imposed standards
   5. Assigned responsibilities
   6. Cost and schedule constraints and goals
   7. Dependencies between the software project and other organizations
   8. Resource constraints and goals
   9. Other constraints and goals for development and/or maintenance.

d. Initial allocated requirements have been documented.

e. Adequate resources and budget for software project planning have been identified and allocated. Adequate budget generally means 1-2% of the software project budget.

f. Customer/sponsor required documentation (e.g. Computer Resources Life Cycle Management Plan, Software Support Requirements Analysis, Transition Plan, Acquisition Plan, etc.) is available and complete.

2.1.4 Input

Inputs to this step are listed below:

a. Planning budget and trained personnel

b. SIDS Software Project Planning Policy

c. Project's documented software requirements

d. Approved SOW or tasking statement.

e. Organization Software Process Database.

2.1.5 Process Activity

There are four major activities to initiating software project planning: Assigning key project leadership positions, designating the project planning group and reviewing initial plan, developing estimates, and planning software and other activities.

2.1.5.1 Assign Key Project Leadership Positions. This requires the designation of the following categories of individuals to the project *(Note: This is not meant to be an exhaustive list):*

a. Software Project Manager (SPM)

b. Software Configuration Manager

c. Software Quality Assurance (SQA) Manager

d. Software Test Manager.

Identifying an SPM for the project requires accomplishment of the activities listed below *(Note: This is not meant to be an exhaustive list of SPM considerations)*:

a. Ensure candidate has software project management skills

b. Ensure candidate is familiar with the organization standard software process and how to tailor it

c. Ensure candidate has good people and communications skills

d. Ensure candidate has knowledge in the project domain.

2.1.5.2 Designate Project Planning Group and Review Initial Plan. The project planning group is responsible for providing input and reviewing project plans. The composition of this group will vary from project to project, but usually contains the SPM, SCM manager, SQA manager, test manager, and a systems engineering representative.

2.1.5.3 Develop Estimates. The activities listed below must be accomplished when developing estimates:

a. Review the SPTO document to determine the measurement data to be collected for project tracking and oversight.

b. Review the statement of work and the initial allocated requirements to scope the effort.

c. Make initial estimates of software size, cost, schedule, and critical computer resources using the Estimation process document.

d. Estimate the space requirements for the project's software engineering facilities and make a preliminary identification of the hardware, support tools and associated costs (e.g., license fees, maintenance cost) required for the target environment, the host environment and the integration and test environment.

2.1.5.4 Plan the Software Project. In planning the software project, an initial assessment of the following items is necessary:

a. Software objectives, allocated requirements and interface requirements.

b. Customer delivery schedule requirements.

c. Customer budget limitations.

d. System technical constraints.

e. Staffing constraints (in-house and contractors).

f. Contracting needs.

g. Resource requirements; Resource constraints.

h. Software development environment.

i. Software processes to be used.

j. Design, programming, software engineering and test requirements and standards.

k. Configuration management requirements.

l. Quality assurance requirements.

m. Non-deliverable software and hardware requirements.

n. Risks and risk reduction strategies for the project.

o. Documentation requirements.

2.1.6 Output

The output from this step is the initial planning data, including a project budget and/or WBS that includes a line item for the SPP task and the assignment of the project's key leadership positions, including the SPM. The software planning group has been designated and has reviewed the initial project plan.

2.1.7 Exit Criteria

Key leadership positions for the projects have been identified. Members of the software planning group have been identified. Adequate resources, funding have been allocated to perform the planning task, and an initial understanding of the scope of the effort has been accomplished.

2.1.8 Process Metrics

Metrics collected for this step include the effort expended in planning work efforts.

2.2 DEVELOP SDP

2.2.1 Purpose

The purpose of this process step is to develop the SDP for the project. *(Note: This process refers to the software plan as the SDP. Some other terms for this document may be used including, the Development Process Plan (DPP) from IEEE 12207, or the Project Management Plan (PMP))* The SDP is the document that allows the customer insight into all stages of the software development process and addresses the commitments of the software developer to the allocated requirements. It identifies resources, estimates of size and cost, schedules, constraints, capabilities of the software developer's organization and identifies the products to be delivered. The plan identifies a basis for managing and tracking the software activities, and a means for communicating status of the software development tasks. The plan documents each group's responsibility for the development of the software. The organization's standard software process is a major input to the SDP. The SPA contains a description of the RE&CM standard software process, a description of the approved software life cycle strategies, tailoring guidance, a description of the OSPD, and a description of the other RE&CM process assets.
Lessons learned from other projects are another source of input when developing the SDP. These lessons learned should be reviewed before developing software plans.
Note: Some sections of the SDP may exist as stand-alone documents, such as the CM, SQA, or Training plans.

2.2.2 Role and Responsibility

The SPM, or whomever the SPM designates, is responsible to lead the development effort for the SDP. The SQA lead supports development of the project's SQA Plan and identification of project standards and procedures. The SQA lead must review and approve the SDP.

2.2.3 Entry Criteria

The entry criteria for this step are listed below:

a. The SPM has been designated and is responsible for the creation of the SDP.

b. The initial software size, cost, schedule and resource estimates have been developed.

c. Adequate resources and budget for project planning have been identified and allocated.

d. The software quality assurance, configuration management, and software engineering group task leaders have been identified and assigned.

e. The project planning group has been designated and has reviewed the initial plan.

f. Those responsible for developing the project's planning documents are skilled or have received training in software project planning and software estimating.

g. Those responsible for developing the project's defined software process are skilled or have received training in on how to tailor the organization's standard software process and to use related software process assets.

2.2.4 Input

The inputs for this step are listed below:

a. Initial planning data, approved SOW, SDP template, OSPD.

b. The organization standard software process (e.g. SPA document, SCM process, Risk Management process, SQA process, etc.)

2.2.5 Process Activity

In this step, the planning group needs to review the OPMP, the lessons learned database, and download and become familiar with the SDP Template. Tailoring the SDP template will require that the planning group address the following items:

a. Scope/Objective/Goals - Define the project's purpose, the customer, the scope of the project to bound the project, the project's goals and objectives, the product delivery date and criteria for determining the project's success.

b. Requirements - Identify the database of requirements allocated to software, the functional requirements that the allocated requirements support, and a high-level summary of the entire project. Allocated requirements are the basis for software plans, work products, and activities. Also refer to the Requirements Management Guidebook on the SEPO home page.

c. Project Organization - Identify the project's organizational structure and define the relationship among the organizational elements. Identify for each organizational element its authority and responsibility for each major task area.

d. Task Definition - Refine the major tasks to develop the software (e.g., software design, software test, independent verification and validation). This can be accomplished using a work breakdown structure format.

e. Schedule - Refine the project's overall schedule and schedules associated with each task including significant events (reviews, audits, key meetings) related to the task and interdependencies with other tasks. Determine and manage the critical path of the project. Identify those tasks on the critical path and closely monitor the status of those activities. Identify, negotiate, and track critical dependencies between engineering groups. *(Note: Project management tools, such as Microsoft Project may be used to develop and manage the project schedule and resources)*

f. Cost - Refine the cost for the software product, contracting efforts, quality assurance efforts, configuration management efforts, training expense, software development environment, software test environment, software licenses and travel expenses. The cost should be expressed as a total cost throughout the life of the project and as yearly cost for multi-year projects. Resource Requirements – Refine any human resources, software resources and hardware resources and any limiting factors associated with each resource (e.g., dates available, skill type, sequences of events and dependencies).

   1. Human Resources - Identify the human resources by skill type (management, software engineering, testing, configuration management, quality assurance) assigned to each task in the project's schedule. Indicate the chronological time and duration when the resources are required.
   2. Software Resources - Identify the software resources that are necessary for the project, the provider of the software (e.g., government-furnished, commercial off-the-shelf, non-developmental item, new development), and the need dates.
   3. Hardware Resources - Identify the equipment that is necessary for the project, the provider of the equipment (e.g., government-furnished, contractor-furnished, commercial), procurement agreement (purchase, rental, existing) and the need dates.
   4. Critical Computer Resources - Identify any critical computer resource (i.e., memory, throughput, Input/Output) that will impact any task within the project. The available capacity for the critical computer resources will provide for a specified reserve capacity. A threshold will be established for each critical computer resource, which when projected to be exceeded requires action.

Software Process - Identify the techniques, methodologies and tools for the development and control of the software through all its development phases (e.g., preliminary design, detailed design, implementation, integration, testing, internal/external reviews, inspections, corrective action process, problem/change reports, software product evaluation). The project's defined software process should be derived and tailored from the organization standard software process. The project's defined software process will be managed and controlled.

g. Software Standards - Identify the standards and procedures that will be used for design and implementation of the software product(s) including language-specific standards, the contents and maintenance of the software development files.
h. Software Development Environment/Software Test Environment - Identify the software development environment and software test environment. Address their performance requirements. Identify any custom tailoring of the environments that are needed for the project and the schedule for the environments including dates of installation, date of availability, need date and duration. Include any maintenance requirements for the environments. Once the facilities and support tools have been identified, responsibility for procuring them is documented in the SDP.
i. Software Licenses - Identify all software license agreements associated with the software development environment, software test environment, target environment, maintenance environment and the delivery of the product and associated software package to the customer. Determine the approach the project will use for each licensed item and maintenance agreement for each licensed item.
j. Documentation - Identify the documentation standard or the format to be used to develop the project documentation. Identify specific tailoring of documents, delivery medium, delivery schedule, document review cycle, project management reports and maintenance of documentation.
k. Risk Analysis and Risk Reduction - Identify the risks in the software project by utilizing a risk analysis method which provides risk identification, risk factors, risk assessment, risk prioritization, risk management strategies, risk resolution, risk monitoring techniques and document the contingency procedures for each area of risk on the project.
l. Training - Identify the required training needs and associated efforts (e.g., on the job training assignments) necessary for the staff in such areas as software methodology, tools, languages, and software packages. Also, identify the training requirements for the customer to effectively use the delivered software.
m. Project Constraints - Identify the constraints that will impact meeting the customer's goals (i.e., start date, completion date, specific tools, software development environment, software test environment, availability of tools or environments, resources, and dependencies on external activities relating to project commitments).
n. SQA - Identify the organization's structure and personnel resources for performing SQA activities on the software products produced for the customer and the SQA activities for evaluating the software engineering or development processes. Define the approach for evaluating the software and associated documentation, the software engineering processes, and identify the tools utilized by the SQA group. .
o. Configuration Management - Identify the organization's structure and personnel resources for performing software configuration management for the software developed or used throughout the project. Define the configuration control flow used for changes to software and documentation and deliveries of products. Refer to the SCM Process document and associated templates for further details.
p. Contracting Needs - Identify any technical agreement or contract that is needed by the project to meet its goal. Define for each technical agreement or contract the end product to be procured or produced, type of agreement/contract, type of funding, funding expiration date, lead time for contract preparation, award date and cost.

q. Security - Identify the security levels of any facility used on the project. Identify any classified processing or security issues associated with software items (e.g., tool), firmware and hardware.

The SDP template is tailored, incorporating the findings of the planning group into a project-specific draft SDP.

***Note**: At the early stages of a software project many sections of the SDP may include items that are "TBD" (To Be Determined). This is quite normal and does not present a problem as long as those items are planned before their implementation.*

2.2.6 Output

The outputs from this step are the draft SDP and refined estimates for the work effort.

2.2.7 Exit Criteria

The SDP has been developed using the RE&CM SDP template and the RE&CM SPA document as guides. Planning data has been recorded in the SDP and has been provided for storage in the OSPD. Information recorded includes the data needed to reconstruct the estimates and assess their reasonableness.

2.2.8 Process Metrics

The metrics collected for this step include the effort expended planning and developing the SDP.

2.3 REVIEW AND APPROVE THE SDP

2.3.1 Purpose

The purpose of this process step is to identify and correct any defects or missing information in the SDP. The approval of the document will signify the signees commitment to the SDP.

2.3.2 Role and Responsibility

Project manager, senior management, software project manager, program sponsor, project personnel, systems engineering, hardware engineering, system test, SCM, SQA, and other affected groups are responsible for reviewing and approving the SDP.

2.3.3 Entry Criteria

The entry criteria for this step is the draft SDP has been developed.

2.3.4 Input

The input for this step is the draft SDP.

2.3.5 Process Activity

This step includes the tasks listed below:

a. Perform a rigorous technical review of the SDP. One example of such a review is a formal inspection process.. Other types of reviews are described in the process. The purpose of the review is to uncover any defects or missing information in the SDP.

b. Change requests and/or new process definitions developed during SDP production should be submitted to the Integrate and validate corrections to the SDP.

c. Gain commitment to the SDP. This process should include the project manager, the SPM, the project sponsor, and other groups, internal and external to the organization, who are affected by the SDP. Affected groups, both internal and external to the organization, should also approve the SDP by either participating in the peer review or by signing the signature page of the SDP indicating their commitment and acceptance of the SDP. All software project commitments made to individuals and groups external to the organization have been reviewed by senior management and communicated to members of the software group.

d. The SDP is put under control using the same SCM procedures as would be used with any other of the project's software documents.

2.3.6 Output

The outputs from this step are listed below:

a. Reviewed and approved SDP.

b. Completed document inspection report filed in project document library.

c. Management and software engineering team commitment to the SDP.

d. Baselined SDP under SCM control.

2.3.7 Exit Criteria

SDP has been reviewed and filed in the project document library. Completed document inspection report has been filed in project document library and copies of any Formal Inspection results have been forwarded to SEPO for inclusion in the OSPD. Defects in the SDP have been corrected and appropriate individuals have committed to the approved SDP.

2.3.8 Process Metrics

The metrics collected from this step are listed below:

a. Effort expended reviewing, making corrections to, and approving the SDP

b. Number and severity of defects found.

2.4 IMPLEMENT SDP PROCESSES AND APPLY SPTO PROCESS

2.4.1 Purpose

The purpose of this process step is to carry out the tasks as detailed in the SDP.

2.4.2 Role and Responsibility

Any project personnel who have a defined task in the SDP is responsible for carrying out their role.

2.4.3 Entry Criteria

SDP has been reviewed, approved, and placed under SCM control.

2.4.4 Input

The input for this step is the baselined SDP.

2.4.5 Process Activity

This step includes the tasks listed below:

a. The project personnel execute the tasks as described in the SDP, invoking the disciplines of the CMM Software Product Engineering (SPE) KPA to ensure quality product engineering.

b. As part of management's planning and monitoring process, the Software Project Tracking and Oversight (SPTO) Process is applied. Project risks are also monitored.

c. The disciplines of the CMM KPA for SQA are applied via the Software Quality Assurance Plan (SQAP) or the processes documented in the SDP. SQA should be performed on both the software development activities and the SPP Process itself. Review SQA reports.

d. The disciplines of the CMM KPA for Software Subcontractor Management (SSM) are applied for sub-contractor work.

e. Actual project data is provided for use in the OSPD.

f. Critical paths and critical dependencies, both internal and external to the project, are tracked and monitored.

2.4.6 Output

The outputs from this step include the products resulting from the executed SDP and the schedule for periodic interactive technical reviews.

2.4.7 Exit Criteria

The SDP is being executed and the work effort monitored and managed. Actual project data is provided to the OSPD. Critical dependencies are managed and controlled.

2.4.8 Process Metrics

The metrics collected for this step are as defined in the SDP and as required by organizational management policy and processes.

2.5 MEASURE AND IMPROVE THE PROCESS

2.5.1 Purpose

The purpose of this process step is to collect metrics and lessons learned on each of the project's processes and use that data to improve the processes.

2.5.2 Role and Responsibility

The SPM or the person designated by the SPM is responsible for monitoring and improving the project's processes.

2.5.3 Entry Criteria

Metrics data has been collected from the software engineering and management process activities.

2.5.4 Input

The input for this step includes the metrics database, change proposals (including feedback from process users), and problem reports affecting the project and organization processes.

2.5.5 Process Activity

This step includes the tasks listed below:

a. Project processes are monitored for improvement opportunities on a periodic basis that is no longer than an implementation cycle. Any re-planning event should include this process analysis.

b. Analyze process metrics, change requests, and problem reports to determine process changes. Compare metrics data to planned and historical data. Investigate variances that exceed the project-specified thresholds. Investigate cause of the variance. If the tasks in the process itself are found to be the cause of the variance, then formulate proposed process changes.

c. 'Lessons learned' derived from analysis of both the OSPD and the project's post-mortem analysis are reviewed for consideration in developing changes to the project's processes.

d. Updates to the organization standard software process, templates, and additions to the RE&CM library of software engineering process-related material are reviewed for consideration in developing changes to the project's processes.

e. Identify required software engineering process changes to support the activities of the selected development strategy and/or rectify problems identified through periodic review of the project's processes.

f. Apply the project planning process disciplines defined in the Software Project Planning Process (Steps 1 – 5).

g. Tailor the selected software processes changes in accordance with tailoring instructions in the SPA document.

h. Review proposed changes and obtain approval from project software management and gain commitment from the software engineering team (i.e., Inter-group Coordination) on the proposed process changes.

i. Enhancements to standard software processes that are deemed beneficial to OI&T should be submitted to the SID utilizing a Document Change Request (DCR) form in an effort to support constant process improvement.

2.5.6 Output

The output from this step is the project's enhanced development strategy and defined software processes formally documented (i.e. SDP, SCM Plan (SCMP), SQAP).

2.5.7 Exit Criteria

Process metrics have been analyzed and proposed process improvements have been implemented.

2.5.8 Process Metrics

The metrics collected for this step include the effort expended analyzing metrics and planning process improvements.

2.6 RECORD LESSONS LEARNED

2.6.1 Purpose

Record and report lessons learned from implementing the project so that other projects can benefit from this information.

2.6.2 Roles and Responsibility

The SPM, or the person designated by the SPM, is responsible for recording and reporting the lessons learned.

2.6.3 Entry Criteria

Lessons learned can be recorded at any time, but are usually recorded after major program milestones have been completed.

2.6.4 Input

The input to this step are the lessons learned from implementation of the project.

2.6.5 Process Activity

Record lessons learned from the implementation of the project. Submit these lessons learned to the OSPD for use by other projects.

2.6.6 Output

The output from this step is the recorded project lessons learned.

2.6.7 Exit Criteria

Project lessons learned have been recorded.

2.6.8 Process Metrics

The metrics collected from this step include the number of lessons learned recorded; and the effort expended collecting and reporting lessons learned.

2.7 REVISE THE SDP

2.7.1 Purpose

The purpose of this process step is to ensure that the SDP remains current.

2.7.2 Role and Responsibility

The SPM, or the person designated by the SPM, is responsible for updating the SDP.

2.7.3 Entry Criteria

SDP, SCM, SQA, and SPTO Processes are being executed, results analyzed, and process improvement proposals drafted.

2.7.4 Input

The inputs for this step include the metrics from the SPTO Process; proposed process changes; and, changes in project plans as directed by the program sponsor.

2.7.5 Process Activity

This step includes the tasks listed below:

a. Analyze impact of directed project changes, such as changes in project schedules, resources, etc., as negotiated with the program sponsor.

b. Incorporate approved changes into draft of next revision to the SDP. Provide any updated project planning data to the OSPD.

c. Proceed to Section 2.3 above. The SCM Process for updating the SDP should be the same as for any of the other project documentation.

2.7.6 Output

The outputs from this step are listed below:

a. Next revision to the SDP.

b. Change proposals or problem reports against organizational standard processes forwarded to the appropriate group responsible for the configuration control of organizational standard processes.

2.7.7 Exit Criteria

The SDP has been revised based on data from the process analysis and programmatic changes affecting the project plans. Updated project planning data has been recorded in the OSPD.

2.7.8 Process Metrics

The metrics collected for this step include the effort expended updating the SDP.

SECTION 3. PROJECT PLANNING AIDES

3.1 PROJECT MANAGEMENT TOOLS

Project management tools are an invaluable resource to the SPM. They can automate many of the planning tasks of the SPM such as those listed below:

a. Development of comprehensive plans containing the following items:
   1. Defined project schedule and budgetary goals
   2. Defined areas of responsibility
   3. Schedules for high-level tasks down to great detail
   4. Established task sequences
   5. Defined major/minor milestones
   6. Assigned resources to tasks
   7. Calculated project budget on task-by-task basis

b. Production of the following types of charts and reports:
   1. Activity networks
   2. Gantt charts
   3. Calendars
   4. Work hours forms
   5. Status report forms

Microsoft Project and Primavera are examples of automated tools. SPMs should be cautious when using tools because they can sometimes be overwhelming. If overused, more time will be spent tracking and planning than actually doing work!

One book which may be of assistance to SPMs is 'A Manager's Guide to Software Engineering', R. Pressman, McGraw Hill, 1993.

APPENDIX A. SOFTWARE PROJECT PLANNING KPA TRACEABILITY MATRIX

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
Goal 1		Software estimates are documented for use in planning and tracking the software project.		
Goal 2		Software project activities and commitments are planned and documented.		
Goal 3		Affected groups and individuals agree to their commitments related to the software project.		
Commitment 1		A project software manager is designated to be responsible for negotiating commitments and developing the project's software development plan.	SPP Process/OPMP, SDP Template	Project Org Chart/SDP
Commitment 2		The project follows a written organizational policy for planning a software project. This policy typically states that:	SEPP/RE&CM SPP Policy, SPP Process	RE&CM SEPP/RE&CM SPP Policy
	C2.1	The system requirements allocated to software are used as the basis for planning the software project.		
	C2.2	The software project's commitments are negotiated between the project manager, the project software manager and the other software managers.		
	C2.3	Involvement of other engineering groups in the software activities is negotiated with these groups and is documented.		
	C2.4	Affected groups review the software project's software size estimates, effort and cost estimates, schedules, and other commitments.		
	C2.5	Senior management reviews all software project commitments made to individuals and groups external to the organization.		
	C2.6	The project's software development plan is managed and controlled.		
Ability 1		A documented and approved statement of work exists for the software project.	SPP Process	Tasking statement from sponsor

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
	AB1.1	The statement of work covers scope of the work, technical goals and objectives, identification of customers and end users, imposed standards, assigned responsibilities, cost and schedule constraints and goals, dependencies between the software project and other organizations, resource constraints and goals, and other constraints and goals for development and/or maintenance.		
	AB1.2	The statement of work is reviewed by the project manager, the project software manager, the other software managers, and other affected groups.		Tasking statement
	AB1.3	The statement of work is managed and controlled.		CM control
Ability 2		Responsibilities for developing the software development plan are assigned.	SPP Process/SDP Template, OPMP	SDP
	AB 2.1	The project software manager, directly or by delegation, coordinates the project's software planning.		SDP
	AB2.2	Responsibilities for the software work products and activities are partitioned and assigned to software managers in a traceable accountable manner.		SDP/Project Org Chart
Ability 3		Adequate resources and funding are provided for planning the software project.	SPP Process; SDP Template, Project Training Plan Template	Funding document/Proj WBS/SDP
	AB3.1	Where feasible, experienced individuals, who have expertise in the application domain of the software project being planned, are available to develop the software development plan.		Proj Training Plan
	AB3.2	Tools to support the software project planning activities are made available.		SDP
Ability 4		The software managers, software engineers, and other individuals involved in the software project planning are trained in the software estimating and planning	SPP KPA Trng; (in SPM Course Mat'ls), SWE Training Plan, Project Training Plan Template	Proj Training Plan

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
		procedures applicable to their areas of responsibility.		
Activity 1		The software engineering group participates on the project proposal team.	SPP Process	SDP
	AC 1.1	The software engineering group is involved in proposal preparation and submission, clarification discussions and submissions, and negotiations of changes to commitments that affect the software project.		
	AC 1.2	The software engineering group reviews the project's proposed commitments.		SDP Peer Review report
Activity 2		Software project planning is initiated in the early stages of, and in parallel with, overall project planning.	SPP Process	
Activity 3		The software engineering group participates with other affected groups in the overall project planning throughout the project's life.	SPP Process	SDP Peer Review report
	AC 3.1	The software engineering group reviews the project-level plans.		SDP Peer Review report
Activity 4		Software project commitments made to individuals and groups external to the organization are reviewed with senior management according to a documented procedure.	SPP Process	SDP signature page
Activity 5		A software life cycle with predefined stages of manageable size is identified or defined.	SPP Process; SPA Document, SDP Template	SDP
Activity 6		The project's software development plan is developed according to a documented procedure. This procedure typically specifies that:	SPP Process; SDP Template	SDP
	AC6.1	The software development plan is based on and conforms to the customer's standards, as appropriate; the project's standards; the approved statement of work; and the allocated requirements.		
	AC6.2	Plans for software-related groups and other engineering groups involved in the activities of the software engineering group are negotiated with those groups, the support efforts are budgeted, and the agreements are documented.		
	AC6.3	Plans for involvement of the software engineering group in the activities of other software-related groups and other engineering groups are negotiated with those groups, the support efforts are		

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
		budgeted, and the agreements are documented.		
	AC6.4	The software development plan is reviewed by the project manager, the project software manager, and other software managers, and other affected groups.		SDP Peer Review report
	AC6.5	The software development plan is managed and controlled.		CM Procedure
Activity 7		The plan for the software project is documented. The software development plan covers:	SDP Template	SDP
	AC7.1	The software project's purpose, scope, goals, and objectives.		
	AC7.2	Selection of a software life cycle.		
	AC7.3	Identification of the selected procedures, methods, and standards for developing and/or maintaining the software.		
	AC7.4	Identification of software work products to be developed.		
	AC7.5	Size estimates of the software work products and any changes to the software work products.		
	AC7.6	Estimates of the software project's effort and costs.		
	AC7.7	Estimated use of critical computer resources.		
	AC7.8	The software project's schedules, including identification of milestones and reviews.		
	AC7.9	Identification and assessment of the project's software risks.		
	AC7.10	Plans for the project's software engineering facilities and support tools.		
Activity 8		Software work products that are needed to establish and maintain control of the software project are identified.	SDP Template	CM Plan and CM Audit reports
Activity 9		Estimates for the size of the software work products (or changes to the size of the software work products) are derived according to a documented procedure. This procedure typically states that:	RE&CM Software Estimation Process	Proj software estimation procedure/SDP/software estimation file
	AC 9.1	Size estimates are made for all major software work products and activities.		

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
	AC9.2	Software work products are decomposed to the granularity needed to meet the estimating objectives.		
	AC9.3	Historical data are used where available.		
	AC9.4	Size estimating assumptions are documented.		
	AC9.5	Size estimates are documented, reviewed, and agreed to.		
Activity 10		Estimates for the software project's effort and costs are derived according to a documented procedure. This procedure typically specifies that:	RE&CM Software Estimation Process	Proj software estimation procedure/SDP/software estimation file
	AC10.1	Estimates for the software project's effort and costs are related to the size estimates of the software work products (or the size of the changes)		
	AC10.2	Productivity data (historical and/or current) are used for the estimates when available; sources and rationale for these data are documented.		
	AC10.3	Effort, staffing, and cost estimates are based on past experience.		
	AC10.4	Estimates and the assumptions made in deriving the estimates are documented, reviewed, and agreed to.		
Activity 11		Estimates for the project's critical computer resources are derived according to a documented procedure.	RE&CM Software Estimation Process	Proj software estimation procedure/SDP/software estimation file
	AC11.1	Critical computer resources for the project are identified.		
	AC11.2	Estimates for the critical computer resources are related to the estimates of the size of the software work products, the operational processing load, and the communications traffic.		
	AC11.3	Estimates of the critical computer resources are documented, reviewed, and agreed to.		
Activity 12		The project's software schedule is derived according to a documented procedure. This procedure typically specifies that:	RE&CM Software Estimation Process	Proj software estimation procedure/SDP/software estimation file
	AC12.1	The software schedule is related to the size estimate of the software work products (or the size of changes), and the software effort and costs.		
	AC12.2	The software schedule is based on past experience.		
	AC12.3	The software schedule		

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
		accommodates the imposed milestone dates, critical dependency dates, and other constraints.		
	AC12.4	The software schedule activities are of appropriate duration and the milestones are of appropriate time separation to support accuracy in progress measurement.		
	AC12.5	Assumptions made in deriving the schedule are documented.		
	AC12.6	The software schedule is documented, reviewed, and agreed to.		
Activity 13		The software risks associated with the cost, resource, schedule, and technical aspects of the project are identified, assessed, and documented.	RE&CM Software Estimation Process, SDP Template, Risk Mgmt Process, SPP Process, SPTO Process	Risk Mgmt Plan/software estimation file/SDP
	AC13.1	The risks are analyzed and prioritized based on their potential impact to the project.		
	AC13.2	Contingencies for the risks are identified.		
Activity 14		Plans for the project's software engineering facilities and support tools are prepared.	SDP Template	SDP
	AC14.1	Estimates of capacity requirements for these facilities and support tools are based on the size estimates of the software work products and other characteristics.		
	AC14.2	Responsibilities are assigned and commitments are negotiated to procure or develop these facilities and support tools.		
	AC14.3	The plans are reviewed by all affected groups.		
Activity 15		Software planning data are recorded.	RE&CM Software Estimation Process; SDP Template, SPP Process	SDP/software estimation file
	AC 15.1	Information recorded includes the estimates and the associated information needed to reconstruct the estimates and assess their reasonableness.		
	AC15.2	The software planning data are managed and controlled.		

Goal/ Key Practice	Sub Key Practice	Description	Coverage	<Project Coverage> Document Section
Measurement 1		Measurements are made and used to determine the status of the software planning activities.	SPTO Process; Practical Software Measurement	SPTO/software measurement plan
Verification 1		The activities for software project planning are reviewed with senior management on a periodic basis.	SPP Process, SPTO App A Attachment G	Project's management review procedure
	V1.1	The technical, cost, staffing, and schedule performance is reviewed.		
	V1.2	Conflicts and issues not resolvable at lower levels are addressed.		
	V1.3	Software project risks are addressed.		
	V1.4	Action items are assigned, reviewed, and tracked to closure.		
	V1.5	A summary report from each meeting is prepared and distributed to the affected groups and individuals.		
Verification 2		The activities for software project planning are reviewed with the project manager on both a periodic and event-driven basis.	SPP Process, SPTO App A Attachment G	Project's management review procedure
	V2.1	Affected groups are represented.		
	V2.2	Status and current results of the software project planning activities are reviewed against the software project's statement of work and allocated requirements.		
	V2.3	Dependencies between groups are addressed.		
	V2.4	Conflicts and issues not resolvable at lower levels are addressed.		
	V2.5	Software project risks are reviewed.		
	V2.6	Action items are assigned, reviewed, and tracked to closure.		
	V2.7	A summary report from each meeting is prepared and distributed to the affected groups and individuals.		
Verification 3		The software quality assurance group reviews and/or audits the activities and work products for software project planning and reports the results. At a minimum, these reviews and/or audits verify:	SQA Process; SQAP Template	SQA reports
	V3.1	The activities for software estimating and planning.		
	V3.2	The activities for reviewing and making project commitments.		
	V3.3	The activities for preparing the software development plan.		
	V3.4	The standards used for preparing the software development plan.		
	V3.5	The content of the software development plan.		

DOCUMENT CHANGE REQUEST (DCR)

Document Title: **Software Project Planning Process**	Tracking Number:
Name of Submitting Organization:	
Organization Contact:	Phone:
Mailing Address:	
Short Title:	Date:
Change Location: (use section #, figure #, table #, etc.)	
Proposed change:	
Rational for Change:	